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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,398	10/12/2005	Hannu Mikkonen	0365-0627PUS1	1581

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EXAMINER
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LAU, JONATHAN S

ART UNIT	PAPER NUMBER
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1623

NOTIFICATION DATE	DELIVERY MODE
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04/14/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/532,398	<b>Applicant(s)</b> MIKKONEN ET AL.	
	<b>Examiner</b> Jonathan S. Lau	<b>Art Unit</b> 1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,5-12,14,15,22-29 and 31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5-12,14,15,22-29 and 31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 29 July 2009 has been entered.

This Office Action is responsive to Applicant's Amendment and Remarks, filed 29 July 2009, in which claim 1 is amended to change the scope and breadth of the claim and new claim 31 is added.

This application is the national stage entry of PCT/FI03/00796, filed 24 Oct 2003; and claims benefit of foreign priority document FINLAND 20021904, filed 25 Oct 2002; currently an English language translation of this foreign priority document has not been filed.

Claims 1, 5-12, 14, 15, 22-29 and 31 are pending in the current application.

### ***Objections Withdrawn***

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Applicant's Amendment, filed 29 July 2009, with respect to objections to the specification has been fully considered and is persuasive, as upon further review the specification sets forth the precise invention for which a patent is solicited.

This objection has been **withdrawn**.

### ***Claim Objections***

Claim 1 is objected to because of the following informalities: claim 1 at line 8 recites "phosphorous". While the ordinary definition of "phosphorous" is "Of or relating to the element phosphorus", the appearance of the term "phosphorous acid" at line 5 of claim 1 renders it confusing as to whether the term at line 8 refers to the element phosphorus P or the acid compound  $\text{H}_3\text{PO}_3$ . Appropriate correction is required.

The following grounds of rejection are modified.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Amended Claims 1, 5-12, 14, 15 and 22-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth (US Patent 3,346,558, issued 10 Oct 1967, of record) in view of Leitheiser et al. (Ind. Eng. Chem. Res. Dev., 1966, 5(3), p276-282, of record).

Roth discloses a process for preparing polyol-glycosides comprising reacting starch, polyol and acid at elevated temperature and pressure (column 1, lines 10-15) using a screw-type extruder (column 2, lines 18-20) that contains two zones for heating (column 2, lines 22-25 and column 3, lines 72-75). Roth discloses the temperature in the range of at least 170 °C (column 1, lines 20-21), which is within the range of 105 to 200 °C [instant claim 5] and 110 to 190 °C [instant claim 22]. Roth discloses the use starch esters or ethers such as starch acetates, carboxymethyl starch, carboxyethyl starch, methyl starch, hydroxyethyl starch, and hydroxypropyl starch (column 2, lines 37-43) [instant claims 1 and 12]. Roth discloses starch, polyol and acid mixture is subjected to intense mechanical working or shearing (column 3, lines 64-67), which is interpreted as compacting and granulating [instant claims 10 and 27]. Roth discloses the mixture fed into a conventional one-screw type extruder (column 4, lines 19-21) [instant claim 11]. Roth discloses the use of ethylene glycol, 1,2-propylene glycol, and glycerol (column 2, lines 60-67) [instant claims 14 and 15]. For example, glycerol is an alkanol with 3 carbon atoms and 3 hydroxyl groups [instant claims 28 and 29]. Roth

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discloses any strong mineral acid can be employed, and discloses non-limiting examples of mineral acid catalysts sulfuric acid and hydrochloric acid (column 3, lines 30-36). Acid catalysts work by protonating the substrate, or forming a chemical bond between the catalyst proton and the substrate, in the instant case a transglycosylation product [instant claim 1]. Roth discloses the alcohol used in a concentration of 0.10 to 2.0 equivalents per gram mole of starch (column 3, lines 1-2). A mixture of 0.1 mole of the alkanol ethylene glycol (62 g/mol) and 1.0 mole of starch (162 g/mol) is approximately 4 weight-% and approximately 9 mole-% [instant claims 7 and 23]. To one significant digit approximately 9 mole-% is approximately 5 mole-% [instant claims 7] or 2 mole-% [instant claim 24]. Roth discloses the mixture of starch, polyhydric alcohol, and acid mixed together and dried after mixing (column 3, lines 53-55) to have a superficially dry mixture (column 4, line 40-43). As calculated above, the liquid reagent of alcohol and acid are approximately 4 weight-% [instant claim 9]. To one significant digit approximately 4 weight-% is approximately 5 weight-% [instant claim 26]. Roth discloses the starch, polyhydric alcohol, and acid composition is mixed and converted into a fluid mass in the first zone of the reactor (column 3, lines 65-72), describing a fluidized-bed type of a mixing device to produce the pre-mixture [instant claim 8].

Roth does not specifically disclose the acidic catalyst consisting essentially of at least one of phosphoric acid,  $\text{H}_3\text{PO}_4$ , hypophosphorous acid,  $\text{H}_3\text{PO}_2$ , and phosphorous acid,  $\text{H}_3\text{PO}_3$  (instant claim 1). Roth does not specifically disclose prior to performing the transglycosylation reaction the alkanol and acidic substance are mixed together and an

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aerosol is produced from this mixture (instant claim 6). Roth does not specifically disclose the process wherein the amount of the alkanol is approximately 0.015 to 0.3 mole-% of the amount of the starch ester or the starch ether (instant claim 25).

Leitheiser et al. teaches mixing the alkanol and acidic substance prior to performing a transglycosylation reaction and heating the mixture to 250 °F under reduced pressure (page 277, left column, lines 30-34), which would inherently produce some of the of the mixture in the form of an aerosol. Leitheiser et al. teaches the use of an acidic catalyst of sulfuric acid and phosphoric acid (page 277, left column, lines 30-34), a phosphorus-containing acid that is a strong mineral acid. Leitheiser et al. teaches that mixing the alkanol and acidic substance prior to performing a transglycosylation reaction avoids the gelation of mixing starch, polyhydric alcohol, and acid that makes good heat transfer difficult (page 277, left column, lines 10-15).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the process for preparing polyol-glycosides comprising reacting starch, polyol and acid using a screw-type extruder disclosed by Roth with the teaching of mixing the alkanol and acidic substance prior to performing a transglycosylation reaction and an acidic catalyst of sulfuric acid and phosphoric acid of Leitheiser et al. Leitheiser et al. teaches that mixing the alkanol and acidic substance prior to performing a transglycosylation reaction avoids the gelation of mixing starch, polyhydric alcohol, and acid that makes good heat transfer difficult. Roth also teaches that adding the starch to an alkanol and acid composition eliminates the gel state (column 1, lines 46-50). Although Roth does not specifically disclose the use of a phosphorous-containing

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acid, Roth discloses any strong mineral acid can be employed (column 3, lines 35-36). Therefore one of ordinary skill in the art at the time of the invention would be motivated to combine the invention of Roth with the teaching of Leitheiser et al. based on the suggestions of both Roth and Leitheiser et al. With regard to the amount of the alkanol as a mole-% of the amount of the starch ester or the starch ether, "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical", see MPEP 2144.05 II.A. Roth teaches it is within the level of ordinary skill in the art to discover the optimum or workable ranges by routine experimentation.

**Response to Applicant's Remarks:**

Applicant's Remarks, filed 29 July 2009, have been fully considered and found not to be persuasive.

Applicant notes that Roth teaches sulfonic acids and boron trifluoride ether complexes are the preferred catalysts and teaches mineral acids as somewhat inferior, Roth teaches that "mineral acids have a tendency to pit the apparatus in which the reaction is being carried out and yield polyol-glycosides of somewhat darker color (column 3, lines 35-40). Applicant points to Ex parte Whalen 89 USPQ2d 1078 (Bd. Pat. App. & Int. 2008). For example at 1084:

"In the same way, when the prior art teaches away from the claimed solution as presented here (FF12, FF20, FF22 and FF 24), obviousness cannot be proven merely by showing that a known composition could have been modified by routine experimentation or solely on the expectation of success; it must be shown that those of ordinary skill in the art would have had some apparent reason to modify the known composition in a way that would result in the claimed composition."



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However, in the instant case, Leitheiser et al. teaches the advantage that addition of phosphoric acid reduced coloration of the glycol used and the glycoside mixture was light tan (page 277, right column, paragraph 3), supporting the motivation to combine Roth in view of Leitheiser et al. and showing that one of ordinary skill in the art would have had some apparent reason to modify the known invention in a way that would result in the claimed invention by improving an aspect in which Roth suggests the mineral acids to be inferior.

Applicant notes that amended claim 1 recites the acidic catalyst consisting essentially of at least one of phosphoric acid,  $H_3PO_4$ , hypophosphorous acid,  $H_3PO_2$ , and phosphorous acid,  $H_3PO_3$ . However, MPEP 2111.03 provides the transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention and citing *In re De Lajarte*, 337 F.2d 870, 143 USPQ 256 (CCPA 1964) and *Ex parte Hoffman*, 12 USPQ2d 1061, 1063-64 (Bd. Pat. App. & Inter. 1989) provides "applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant's invention." The specification at pages 17-24 provides evidence comparing the method wherein the acidic catalyst is either 100% sulfuric acid or 100% hypophosphorous acid. Applicant's remarks filed 29 Apr 2009 assert a material change for the process using TsOH embodied by Roth, but no evidence is provided by way of oath or declaration. Leitheiser et al. teaches an acidic catalyst of sulfuric acid and phosphoric acid that is 50% by weight sulfuric acid and 50% by weight phosphoric acid (page 277, left column,

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lines 30-34). The evidence of record does not show that an acid catalyst of 50% by weight sulfuric acid and 50% by weight phosphoric acid would materially change the characteristics of applicant's invention because the only evidence provided is 100% sulfuric acid or 100% hypophosphorous acid.

Amended Claims 1, 5-12, 14, 15, 22-29 and 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roth (US Patent 3,346,558, issued 10 Oct 1967, of record) in view of Leitheiser et al. (Ind. Eng. Chem. Res. Dev., 1966, 5(3), p276-282, of record) and further in view of Fuzesi (US Patent 3,399,190, issued 27 Aug 1968, cited in PTO-892).

Roth in view of Leitheiser et al. teaches as above. Leitheiser et al. teaches the advantage that addition of phosphoric acid reduced coloration of the glycol used and the glycoside mixture was light tan (page 277, right column, paragraph 3). Leitheiser et al. teaches excellent flame resistance was observed when 1.1% phosphorus was included in the formulations (page 278, left column, paragraph 2).

Roth in view of Leitheiser et al. does not specifically teach the method wherein the acid catalyst consists of at least one of phosphoric acid,  $H_3PO_4$ , hypophosphorous acid,  $H_3PO_2$ , and phosphorous acid,  $H_3PO_3$  (instant claim 31).

Fuzesi is drawn to the field of preparation of polyurethane foams by the reaction of a starch with a polyhydric alcohol (column 1, lines 25-45). Fuzesi teaches the reaction between starch, phosphoric acid, and 1,2 oxide (column 2, lines 70). Fuzesi teaches it is advantageous to use phosphoric acid because the product has satisfactory

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flame retarding properties (column 2, lines 20-30) and suggests the advantage of economics, availability and ease of handling (column 2, lines 45-50).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Roth in view of Leitheiser et al. and further in view of Fuzesi. One of ordinary skill in the art would have been motivated to combine Roth in view of Leitheiser et al. and further in view of Fuzesi to substitute the sulfuric acid/phosphoric acid catalyst taught by Roth in view of Leitheiser et al. with the phosphoric acid taught by Fuzesi because Leitheiser et al. teaches the advantage that addition of phosphoric acid reduced coloration of the glycol used and the glycoside mixture was light tan and excellent flame resistance was observed when 1.1% phosphorus was included in the formulations and Fuzesi teaches it is advantageous to use phosphoric acid because the product has satisfactory flame retarding properties and suggests the advantage of economics, availability and ease of handling. One of ordinary skill in the art would have a reasonable expectation of to combine Roth in view of Leitheiser et al. and further in view of Fuzesi because Fuzesi suggests the phosphoric acid can be used in place of a mixture of phosphoric acid and any inorganic or Lewis acid (column 2, lines 70 and column 3, lines 1-10), or that such mixtures are equivalents known for the same purpose.

**Response to Applicant's Remarks:**

Applicant's Remarks, filed 29 July 2009, have been fully considered and found not to be persuasive.

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Applicants Remarks with regard to the Roth teaching away from the combination of Roth in view of Leitheiser et al. are address as above. With regard to Fuzesi, Fuzesi teaches it is advantageous to use phosphoric acid because the product has satisfactory flame retarding properties and suggests the advantage of economics, availability and ease of handling. Therefore, Fuzesi provides further reason to modify the known invention in a way that would result in the claimed invention beyond the reason discussed as above regarding Roth in view of Leitheiser et al.

### ***Conclusion***

No claim is found to be allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan S. Lau whose telephone number is 571-270-3531. The examiner can normally be reached on Monday - Thursday, 9 am - 4 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia Anna Jiang can be reached on 571-272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jonathan Lau  
Patent Examiner  
Art Unit 1623

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Examiner, Art Unit 1623